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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/040,395

01/07/2002

Cheisan J. Yue

P01,0365

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07/28/2004

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EXAMINER

HU, SHOUXIANG

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 07/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/040,395

Applicant(s)

YUE ET AL.

Examiner

Shouxiang Hu

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20,30 and 32-40 is/are pending in the application.
- 4a) Of the above claim(s) 1-20 and 30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 32-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claim 1-20 and 30 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, according to the previous office action. As a result, claims 1-20, 30, and 32-40 are pending in this application; and claims 32-40 remain active in this Office action.

Claim Objections

2. Claim 40 is objected to because of the following informalities and/or defects:

Claim 40 refers to claim 21, but claim 21 is already canceled according to the 07-02-04 amendment.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
4. Claims 32-40, as being best understood in view of the claim objection above, are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang et al. ("Chiang"; US 5,038,184) in view of Litwin et al. ("Litwin"; US 6,100,770).

Chiang discloses a method for making a varactor (see Figs. 2-3 and 7; also see col. 4, lines 26-36, col. 5, lines 14-64, and col. 7, lines 32-35), comprising: forming a plurality of alternating lightly doped wells or body (47) and heavily doped N⁺ region regions in a silicon layer of an SOI structure; forming a plurality of gate oxides (44); forming a plurality of polysilicon gates (46); electrically coupling each of the polysilicon gates together; and, electrically coupling each of the heavily doped second conductivity type region regions together, wherein the lightly doped wells and the heavily doped N⁺ regions both extend from the top to the bottom of semiconductor layer (42).

Although Chiang does not expressly disclose that the lightly doped well or body region can be P-type doped, one of ordinary skill in the art would readily recognize that the lightly doped well or body regions in an varactor can be commonly and desirably n-type lightly doped for forming a depletion-type channel region with good channel modulation sensitivity, as evidenced in Litwin (see the P-type lightly doped well or body region (22) and the heavily doped N⁺ region in the varactor of Fig. 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the making of the P-type lightly doped well or body regions of Litwin into the method of Chinag, so that a method for making a varactor with a commonly desired highly sensitive depletion-type channel regions would be obtained. And, with the P-type lightly doped regions in the above collectively taught method, N⁺/P- junctions would be naturally formed therein.

Regarding claims 34-36, it is art-known that silicon-insulator substrates of both the silicon-on-oxide type (SOI type, which normally naturally includes a highly resistive

silicon bottom layer) and the silicon-on-sapphire type (SOS) had become readily available for either N-channel or P-channel type MOS devices, as readily evidenced in the prior art such as Tsang (US 5,563,438; see col. 3, lines 36-37).

Regarding claims 38-40, Litwin further teaches that each of the silicon gates can have a width-to-length ratio in a range covering a ratio of approximately 16 to 1 (see col.6, lines 10-17). And, it is noted that high capacitor switching ratio is commonly desirable in the art and that the width-to-length ratio and the capacitor switching ratio are both art-recognized parameters of importance subject to routine experimentation and optimization.

Response to Arguments

5. Applicant's arguments with respect to claims 32-40 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is 571-272-1654. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SH

July 22, 2004



SHOUXIANG HU
PRIMARY EXAMINER